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WAGE AND EMPLOYMENT EFFECTS OF IMMIGRATION TO GERMANY: AN ANALYSIS BASED ON LOCAL LABOR MARKETS

Jörn-Steffen Pischke
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massachusetts
institute of
technology

50 memorial drive
cambridge, mass. 02139

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Jörn-Steffen Pischke
Massachusetts Institute of Technology

Johannes Velling
Zentrum für Europäische Wirtschaftsforschung (ZEW)

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Abstract

We analyze the impact of increased immigration on labor market outcomes of natives in Germany using a dataset of county level variables for the late 1908s. In order to construct more unified labor market regions we aggregate the 328 counties to 167 larger regions. We study two measures of immigration, the change in the share of foreigners between 1985 and 1989 as well as one year gross and net flows of immigrants to an area. In order to address the potential problem of immigrant selection into local labor markets with superior performance we instrument the change in the foreign share by its previous level. Especially for unemployment we find large effects of an increased foreign share. We conjecture that these results might be spurious. Foreigners tend to be concentrated in lower unemployment areas but unemployment tends to be mean reverting during the boom period we study. This leads to a positive correlation between the instrument and the change in unemployment. Taking account of the mean reversion in unemployment we find no detrimental effect of immigration. Similar results are obtained on the basis of one year flow data of foreigners. We also find no support for the hypothesis that the absence of displacement effects are due to a response of native migration patterns. The initial settlement of immigrants in Germany is largely independent of labor market conditions. Subsequent internal moves by foreigners are more responsive to local unemployment albeit much less than internal migration of natives.

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Jörn-Steffen Pischke
Department of Economics
MIT
50 Memorial Drive
Cambridge, MA 02139
U.S.A.
Tel: 1-617-253-1942
e-mail: jsp@mit.edu

Johannes Velling
Zentrum für Europäische
Wirtschaftsforschung
Kaiserring 14-16
68161 Mannheim
Germany
Tel: 49-621-1235-153
e-mail: jve@zew.zew-mannheim.de

1 Introduction

Migration into Germany has increased by large amounts during the late 1980s. Probably the most contentious economic issue surrounding increased immigration is the impact of the inflow of foreign workers on the labor market outcomes of natives in the host country. This has been the focus of much research in the U.S. in recent years. Typically, only minor negative effects of increased immigration have been found in these studies. While there is a strong feeling in the German public that migrants threaten the position of natives in current times of slack labor markets there have been only few econometric studies on this issue with somewhat mixed results. Therefore, another look at this question is clearly warranted.

We analyze the impact of immigration on local labor markets using a data set for the 328 counties in West Germany for the years from 1985 to 1989. Since there are often large commuter flows between counties we aggregate these into 167 larger labor market regions. Using semi-reduced forms as well as a more structural approach allowing immigrant selection into more prosperous labor markets, we estimate the effect of the share of foreigners in a locality on outcome measures for natives in a variety of specifications. Most of our results refer to employment or unemployment effects which are probably the primary concern of the general public. However, we also analyze manufacturing wages. We find the economic expansion of the late 1980s affected local labor markets differentially. Not accounting for this phenomenon may lead to seriously biased estimates of the immigration effect. In our preferred specifications

immigrants have no detrimental impact on native labor market outcomes.

There is some concern that foreign migration may be offset by migratory patterns of natives. To address this issue we also look at migration flows between counties and labor market regions for foreigners and natives in 1987. We find little evidence that immigrants choose their residence on the basis of economic factors during this period. This may be due to the fact that a large share of the migrants during this period are politically motivated refugees rather than economic migrants. We do not find evidence that higher immigration depresses the in-migration of natives. Instead, foreigners and natives seem to be attracted to the same locations. Using the flow data for 1986 to 1988 to analyze unemployment effects of immigration yields no systematic impacts.

In the next section we review some of the literature in this area and outline how this paper relates to previous work. Section 3 describes the data we use. Section 4 sets out the analytical framework we use and presents results for the share of foreigners in 1985 and 1989. The next section analyzes the flow data followed by a brief conclusions in section 6.

2 Literature Review

The concerns about the effects of immigrants on the host economy have a long history but the 1980s have been a period of particularly active investigation of this question in the U.S. We will not attempt to survey this literature in an exhaustive fashion here but rather concentrate on outlining the major empirical strategies that have been followed and criticisms that have been

raised.[1]

Three basic approaches have been taken to assess the labor market effects of immigration. One is to recognize that immigrant labor is often less skilled and estimate substitution elasticities in a system of labor demand equations with multiple labor inputs (e.g. Grossman, 1982). This approach has not been used for Germany because wage data are not available separately for natives and immigrants.

The second strategy has relied on a reduced form approach that compares labor market segments with differing immigration rates. Examples of this approach are Altonji and Card (1991), Butcher and Card (1991), LaLonde and Topel (1991), and Simon, Moore, and Sullivan (1993) who use local labor markets as the basis for the analysis. One problem with this approach is that immigrants may locate in cities or areas with booming labor markets creating a potential simultaneity problem. Altonji and Card (1991) have used immigrant stocks in an area to instrument for immigrant inflows. This strategy is suggested by the observation that many foreigners tend to settle in places where previous migrants live and thus form immigrant enclaves, an observation made by Bartel (1989).

The simultaneity issue is addressed directly in the third approach which studies the effects of isolated, exogenous inflows of migrants like Card's (1990) analysis of the effect of the Mariel Boatlift on the Miami labor market or Hunt's (1992) study of the repatriation of French after the Algerian War. The tenor of this literature is that the employment effects of immigration are negligible while there may be some negative wage effects of recent immigrants, see the survey by Borjas (1990).

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[1]For more complete surveys see Greenwood and McDowell (1986), Borjas (1990), and Hamermesh (1993).

Work on Germany has typically followed the reduced form approach. Winkelmann and Zimmermann (1992) have addressed the issue whether unemployment incidence in the late 1970s and early 1980s was affected by the presence of foreigners. In a companion study, De New and Zimmermann (1993) looked at wage effects. In both cases, the fraction of migrants in a worker's industry has been added to the German Socio Economic Panel. Unlike for the U.S., these studies found detrimental effects of migration on unemployment and on wages. However, it is unclear whether the presence of foreigners in the affected industries is causal in this case. For example, foreigners were largely recruited in the 1960s into manufacturing sectors that were booming at this time. But many of the booming industries of the 1960s became the troubled industries of the late 1970s and 1980s. This will lead to the observed correlation between the number of foreigners in an industry and the incidence of unemployment without telling us much about the labor market impacts of migration. The DeNew and Zimmermann study tries to circumvent this problem by instrumenting the foreign share by industry dummies and trends. This is still problematic since these variables might also capture features of the wage structure unrelated to the foreign share.

We therefore supplement these studies using regional variation in the fraction of foreigners. In principal, regional analyses may be plagued by a similar problem, that booming regions turn into declining regions. However, the period we study is one of expansion so the problems that arise will be of a different nature. We will carefully discuss these issues below.

Analyses based on the shares of foreigners in either a locality or an industry may be plagued by another problem as pointed out by Chiswick (1992, 1993). Natives may react to an increased inflow of foreigners by locating elsewhere thus dissipating the adverse effects of

increased migration. There is conflicting evidence for the U.S. whether this is an important issue. Filer (1992) finds large responses in the migration behavior of natives in the 1970s while Butcher and Card (1991) find no evidence of this for the 1980s. Therefore, we also look at native migration patterns to assess the Chiswick-Filer criticism.

3 The Data

The bulk of our data are taken from Bundesforschungsanstalt für Landeskunde und Raumordnung (1992), a tabulation of aggregates on a variety of issues at the level of counties and statistical regions, as well as a previous issue of the same publication. We obtained these tabulations directly in machine readable form. In addition, we have added other county level information from the Federal Statistical Office (Statistisches Bundesamt) and various issues of the Amtliche Nachrichten der Bundesanstalt für Arbeit.

The relevant variables in this dataset pertain to the years 1985 to 1989. This is an interesting period to study the labor market impact of immigration for a variety of reasons. First, 1985 was the first year after the recession were net immigration became positive again. It then increased continuously throughout the years of German unification. Secondly, excluding the unification period seems prudent, since many other labor market influences may have been confounding immigration effects since 1990. Furthermore, the late 1980s were a period where aggregate unemployment was still relatively high, between 7 and 9 percent, thus making fears of job loss to immigrants of particular relevance for German workers. The cost of using this time

frame is that it covers a period of strong expansion where absorption of immigrants into the labor market may be easier than in periods of economic slack.

There are 328 counties with a population ranging from 2.1 million in Berlin to 33,000 in Zweibrücken. In the cases of larger cities, counties will coincide with the city boundaries. Often these are surrounded by one or more suburban counties. Therefore, a county may not be the ideal definition of a local labor market. In particular, foreigners are more likely to live in cities rather than in the suburbs. Their presence may still affect natives living in the suburbs and commuting to work in the urban center. To counter these problems we aggregate the counties to 167 labor market regions as suggested by Eckey and Klemmer (1991). This regional aggregation is both fine enough where labor markets are largely local while creating unified metropolitan areas for the large urban areas. The coarser the regional aggregation, the more easily can biases be avoided that arise from the fact that our regions do not correspond to true labor markets. On the other hand, the coarser groupings will be less efficient as they eliminate between county variation in the variables. We feel that the labor market regions strike a good balance between consistency and efficiency. We also eliminated Berlin throughout from the analysis since it plays a special role as a gateway city for Eastern European immigrants and may differ substantially for this reason.

As our dependent variables we use a variety of employment indicators. If there is little movement of labor between specific submarkets divided along lines of sex, skill, or occupation, then we should use employment indicators for these submarkets. For example, Altonji and Card (1991) use sex and race cells for low skilled workers within local labor markets as the basis of their analysis. In the German context, a skill based division would be most sensible, since there

is little mobility across these lines. Unfortunately, our data do not allow such a disaggregation. Therefore we use as our basic dependent variable the employment rate for Germans in a local labor market, defined as employment divided by the population age 15 to 64. As an alternative we also examine unemployment rates, since this is the variable the public is most aware of and concerned about. We also present some results based on manufacturing wages, the only wage measure available. This variable is obtained by dividing total payroll in manufacturing by manufacturing employment. Limiting the analysis to manufacturing is not that restrictive since most foreign employment is in this sector.

Our key independent variable is the share of foreigners in the total population using the age group 15 to 64, i.e. the economically active population. This variable includes all foreigners who are registered with the local authorities, thus excluding short term visitors, diplomats, or foreign military personnel. Since some of the included foreigners may still belong to groups who are not economically active, like asylum seekers not allowed to work, we also look at the effects of Turks only. This presents a nationality we believe has migrated to Germany primarily for economic reasons and a group that consists almost exclusively of relatively low skilled blue collar workers (see Schmidt, 1992).[2]

Given that our dependent variables are coarse indicators of employment opportunities for natives that will be affected by a multitude of influences, we control for a variety of variables capturing the composition of the local workforce. These will typically be correlated with the number of foreigners for reasons very different from foreign-native substitution. We use the shares of employment in 12 industries, the share of highly skilled workers, the share of unskilled

[2]Of course, this is true in particular for Turks who arrived in Germany earlier than 1985. Some of the new immigrants will be Kurdish refugees who seek asylum for political reasons.

workers, the share of part time workers, the share of female workers, and the share of older workers over age 55. Furthermore, we use dummies for seven different areas of the country as well as the log of the population density in the region. Foreigners tend to be concentrated in more highly populated areas which may differ in their labor market performance for a variety of other reasons.

Table 1 displays some summary statistics for the main variables of interest. These are unweighted means over the labor market regions, thus they do not accurately reflect aggregate values. Means are given for 1985 and 1989 shares as well as for changes between these years. For the employment to population ratio these were calculated as the change in employment divided by population in 1985 and analogously for the foreign share. For the unemployment rate and wages differences of the 1989 and 1985 variables are given. Employment to population ratios were higher for foreigners than Germans in 1985 but fell strongly till 1989. However, from the last column it is clear that employment of foreigners expanded strongly while the foreign working age population, through immigration and ageing, grew even more rapidly. The late 1980s were an expansionary period with nominal manufacturing wages rising by 20 percent and the unemployment rate falling by 3 points. There is a good deal of dispersion in the changes of all variables.

Given German immigration law, the change in the foreign share we define will also include ageing of second generation immigrants. While an argument can be made that any increase in the foreign labor force threatens the position of natives this is presumably not the group the public is most concerned with. In order to isolate recent immigrants, we also analyze migration flows from abroad. This also allows us to study the migratory patterns of natives. We

have gross flow data for each county separately for Germans and foreigners and for domestic and international flows. Unfortunately, we could not obtain the complete 328 x 328 matrix of domestic flows, thus we cannot aggregate the gross flows to labor market regions. Net flows defined as inflows from abroad minus outflows abroad and domestic inflows minus domestic outflows can be aggregated. These net flows may not be the economically most relevant measures, for example, an immigrant from abroad may subsequently move on to another location in Germany. Unfortunately, due to the data limitations we are restricted to analyze these measures only at the level of the labor market regions.

We concentrate on migration flows in 1987. We chose this particular year since net immigration of foreigners had already picked up substantially from the previous years. While increasing further in the late 1980s, during 1988 and 1989 there was also an increasing number of ethnic Germans ("Aussiedler") entering from Eastern Europe. They will make up a large fraction of the inflows of natives from abroad in these years but cannot be distinguished from other Germans. Aussiedler and refugees are typically housed in a few large camps upon arrival before moving on to other areas. This may confound our estimates even for 1987. We therefore eliminated six counties from the sample that had very large gross flows for these groups. Apparently, many immigrants are not immediately classified correctly as German Aussiedler or foreigners when entering; in some of counties we find large gross inflows of foreigners offset by large outflows of Germans to destinations in Germany. The counties we eliminate are Göttingen, Osnabrück (city), Osnabrück (suburban), Unna, Fürth, and Ingolstadt. We also eliminated Bonn and the surrounding Rhein-Sieg county because many of the foreigners there may be journalists etc. with unusual mobility patterns. Finally, we eliminated Berlin, which is a large gateway city

for immigrants from Eastern Europe and occupies a somewhat special role. This leaves 319 counties or 160 labor market regions for the flow analysis.

Table 2 presents some summary statistics on the flow data for the 319 counties and 160 labor market regions we analyze. About 470,000 foreigners entered Germany in 1987. The counties in our data set account for only about 420,000 of these entrants since we omitted some of the highest immigration counties. The flows in our data are still large and highly dispersed across counties and regions. Native gross flows across county borders are also large, about three percent of the population changed their county of residence during 1987. These flows are about ten times as large as domestic migration of foreigners. Recall, however, that the foreign share in the sample is only in the order of five percent, indicating that foreigners actually move twice as often as Germans.

4 Analysis of the 1985 and 1989 Immigrant Shares

The goal of our estimation procedure is to isolate the effect of foreigners on the labor market outcomes of natives. To this end we use the change in the regional concentration of foreigners in West Germany. The economics behind our approach can be summarized as follows.[3] An increase in the number of foreigners living in a certain area will typically increase the supply of labor in that locality. In a standard competitive model we would expect this to have a detrimental direct effect on employment and wages of natives due to increased competition for jobs.

[3]See Ichino (1993) for a detailed review of various models.

However, there are a variety of reasons why this direct effect could be small or positive. First, natives and foreigners could be complements in production. In this case, the result would be reversed. Secondly, labor markets may not be well described by a competitive model. If the labor market is segmented and foreign workers tend to enter the secondary sector while natives tend to stay in the primary sector then spillovers between sectors may be limited. This segmentation could lead to little direct labor market pressure from increased immigration. This could happen, for example, if foreigners form enclaves in which they largely cater to their own countrymen with relatively little interaction with the native economy. Ghettoization in large cities could be a sign of this.

While the sign of the direct effect of foreigners on the labor market outcomes of natives is not theoretically determined there is also a general equilibrium effect with a more clear impact. While foreigners may compete with natives for local jobs, they will also demand good and services produced by natives. Many of these will be produced locally by native workers. This demand effect will tend to increase the demand for native labor thus raising native wages and employment. The higher the share of immigrant demand going to goods produced in other cities or imported the more of this general equilibrium effect will be dissipated. Hence, if the ghettoization hypothesis is correct, this effect will be small but the direct labor market impact of foreigners will be small also.

Theoretical analysis does not allow us to make unambiguous predictions about the impact of foreigners. Our specifications are chosen to capture both supply and demand effects created by foreign workers. The first specification applied to our 1985-89 data is similar to the analysis by Altonji and Card (1991) based on U.S. Statistical Metropolitan Areas. This will establish

some basic results for these data and serve as a comparison to the U.S. literature.

A simple one factor model of supply and demand in the labor market yields the following comparative statics result:

$$\Delta \log w_{it} = A \Delta F_{it} / P_{it-1} \qquad (1)$$

where F_{it} is the number of foreigners in the locality, P_{it} is the entire active population in the local labor market and w_{it} is the wage. Altonji and Card (1991) show that the same result can be derived from a multi-factor model; the coefficient A will then naturally have a different interpretation in terms of the underlying elasticities. Substituting the result in (1) into a labor supply curve yields an analogous result for employment.

We interpret equation (1) as describing the impact effect of an exogenous increase in the share of foreigners and thus in labor supply. In a constant returns to scale economy the local market, after full adjustment of the capital stock, will eventually return to a situation with total employment higher by the number of immigrants, the same employment of natives and the same wage as before. Thus, cross sectional estimation based on (1) will seek to exploit short-term disequilibria due to immigration. Accordingly, our estimating equation has the form

$$\Delta z_{it} = \alpha \Delta f_{it} + \Delta x_{it} \gamma + \Delta \varepsilon_{it} \qquad (2)$$

where z_{it} is a measure of the labor market performance of natives like employment or wages, Δf_{it} is the change in the number of foreigners divided by the total population aged 15 to 64 in the local labor market and x_{it} are other variables that influence labor market outcomes of natives but not including wages or employment. Thus, the equation can be interpreted as a semi-reduced form. The coefficient α will capture both supply and demand side effects of the presence of

foreigners in the labor market. This is therefore the coefficient we are interested in.[4]

Estimation of equation (2) may be affected by an endogeneity problem because foreigners may choose to locate in areas that have particularly strongly growing labor markets. This will lead α to be biased upwards in estimating the wage equation (downwards for unemployment). To address this problem, we follow the strategy of Altonji and Card (1991) and instrument the change in the share of foreigners with its first period level. The idea underlying this strategy is that foreigners tend to locate in cities where a large number of foreigners lives already. We will provide some evidence for this phenomenon below. Furthermore, the instrumentation requires that the stock of foreigners does not directly influence the changes in employment or wages.

OLS and instrumental variable results for the employment to population ratio, the unemployment rate, and the manufacturing wage are displayed in the first two columns in table 3. Increased immigration has some slight negative but insignificant employment effects. The coefficient on the foreign share in the unemployment equation is large and magnified when instrumenting the change in the foreign share by its 1985 level. Interestingly, the same signs are obtained in the wage equation. Since foreigners tend to have higher unemployment rates and lower wages we should observe mechanical relationships with changes in the foreign share. For the employment rate we can separate natives and foreigners. Comparing estimates for the entire population and for Germans only yields little difference. Only the estimates for unemployment can potentially be explained by this mechanical correlation. Overall the results do not conform to any consistent pattern.

Before commenting on possible interpretations, let us turn to similar regressions that use

[4]We do not present estimates in levels of these variables since it is necessary that the variation in the variables is not due to steady state differences between counties.

Turkish immigrants only.[5] This group should be more homogeneous and reflect better the stylized picture of an economically motivated migrant. Table 4 displays the results. They are generally similar to the previous table with the exception of the IV regressions. Now we find relatively large negative employment effects, positive unemployment effects while the wage effect is smaller and insignificant.

These results would be consistent with the interpretation that increased immigration of Turks reduces native employment while affecting the wage relatively little. Less so for the Turks but strikingly for the group of all foreigners in table 3, the unemployment effects do not seem to be fully reflected in reduced employment. Together with various other pieces of evidence this lets us believe that these estimates are likely to be spurious and do not reflect the labor market impacts of immigration. First, the magnitudes involved are too large to be reasonable. A coefficient of two in the unemployment equation means that raising the share of foreigners by one percentage point raises the unemployment rate by two percentage points. The size of the population aged 15 to 65 in West Germany is about 43 million. Thus a one point change in immigration refers to 430,000 foreigners. The total labor force is roughly 25 million, a one point change corresponds to 250,000 workers. Hence 430,000 immigrants would lead to 500,000 additional unemployed, or more than one unemployed worker for every entering foreigner, which seems too high.

Furthermore, the wage effect and the unemployment effect are both positive and the wage effect is also large, though imprecisely determined. Few models of the labor market are

[5]Unlike in table 3, we use the share of Turks in the population including all age groups, not just the ages 15 to 65. This split is not available in our data by nationality.

consistent with such results.[6] Finally, in the unemployment equation the test of the over-identifying restrictions is rejected. This is only a relatively weak piece of evidence, since the restrictions are based purely on the functional form of the instrument. Still, it indicates that the IV regressions may be misleading in this case.

We turn to a potential explanation based on selectivity next. Even the share of foreigners in 1985 may not be exogenous in these regressions. If unemployment and wage trends are persistent over time then previous immigrants could have been locating in labor markets that were and continue to be improving. While this story may explain the results for the wage equation additional assumptions are necessary to explain the results for the unemployment rate. Essentially what is necessary is that the unemployment rate be mean reverting.

The late 1980s were a period of general economic expansion and unemployment decreased from its relatively high level in 1985. This high average is masking a lot of dispersion at the local level. The area with the highest unemployment rate in 1985 is Leer near the Dutch border with a rate of 19.7 percent while the low is 3.6 percent for Künzelsau in northern Baden-Württemberg. We believe that cross sectional unemployment rates have a strong tendency for mean reversion in booms. This conjecture is supported by two facts in our data. A regression coefficient of the change in the unemployment rate between 1989 and 1985 on the 1985 level yields a coefficient of -0.31 with a t-statistic of 7.9. The cross-sectional standard deviations fell by 20 percent from 0.034 to 0.027. A more detailed look at the regions with large declines in unemployment rates reveals that they are mostly rural areas in marginalized areas like the North Sea coast or the Czech border in Bavaria. These regions have a very low density of foreigners

[6]An exception is the segmented labor market model by Dickens and Lang (1993), distinguishing three types of workers, that can lead to a variety of unusual comparative statics results.

in 1985. If foreigners selected into regions with low unemployment rates and high unemployment areas revert to the mean then we may see a large positive correlation between the density of foreigners and the change in the unemployment rate. Figure 1 plots the reduced form relationship observed in the unemployment equation in table 3. It reveals that a few regions with strongly falling unemployment rates contribute a lot to the problem.

Figure 2 plots the evolution of the distribution of unemployment over time. For this figure we grouped unemployment rates into eight bands based on their 1985 rank. The figure shows the evolution of the mean rates for the eight groups. This procedure will filter out (most of) the short term transitory movements in unemployment rates and shows that the ranking of the group means stays constant over time. It can also be seen how the whole distribution contracts as unemployment rates fall in 1989.

Since our earlier instrumentation obviously does not help in identifying the coefficient of interest, the labor market impact of increased immigration, we pursue an alternative strategy considering a structural model for the unemployment process and immigrant selection based on the facts we just described. The key assumption we make is that immigrant inflows depend on the level of the previous unemployment rate, not the change. The Altonji and Card (1991) setup implies that there is selection based on the change in employment. The following simple linear relationship seems a more natural way to model the selection process. Let immigrant selection be given by:

$$\Delta f_{it} = \beta u_{it-1} + v_{it} \qquad (3)$$

We continue to assume that it is immigrant inflows, not levels, that yield an unemployment rate above its steady state level. The model for unemployment is given by:

$$u_{it} = \lambda_t(u_i^* + \varepsilon_{it}) + \alpha\Delta f_{it} \qquad (4)$$

This simple model captures the idea that unemployment rates will spread out in recessions (high λ_t) and contract in booms. We should note that it does not fully describe the data over longer time horizon but it captures some major features in the data for the 1985 to 1989 period. We discussed a few features of the data above which are consistent with this model. We present a few more pieces of evidence for equation (4). Unemployment in the model consists of a county specific variance component and a white noise component. The variances of both will be blown up by the business cycle factor λ_t. This implies a linear relationship between the mean unemployment rates and the standard deviations over time which passes through the origin. The values for the period 1985 to 1989 fits this relationship well; they are displayed in table 5.[7] The table also reports the correlation matrix of the five unemployment rates. The variance component structure in (4) implies that the autocorrelations should be constant at all lags and over time (and are given by $\sigma^2_{u^*}/(\sigma^2_{u^*} + \sigma^2_{\varepsilon})$). It is obvious from the table that this is not literally true, there are additional short run dynamics in the data, but the model clearly describes the bulk of the cross sectional variation in unemployment rate.

If immigrant selection and the unemployment rate are described by (3) and (4) then running the following regression will yield an estimate for the coefficient of interest α:

$$u_{it} = b_1 u_{it-1} + b_2\Delta f_{it} + e_i \qquad (5)$$

The coefficient on the change in the foreign share will serve as an estimate for α:

[7]A regression of the mean unemployment rate on the standard deviation using the five values in table 5 yields a regression slope of 2.2 and an intercept of 0.016 with a t-statistic of 1.7 (neglecting the fact that the standard deviations are obtained as prior estimates).

$$
\begin{aligned}
plim\ \hat{b}_2 &= \frac{var(u_{it-1})cov(\Delta f_{it},u_{it}) - cov(\Delta f_{it},u_{it-1})cov(u_{it},u_{it-1})}{var(u_{it-1})var(\Delta f_{it}) - cov(\Delta f_{it},u_{it-1})^2} \\
&= \frac{var(u_{it-1})[\beta cov(u_{it},u_{it-1}) + \alpha\sigma_v^2] - \beta var(u_{it-1})cov(u_{it},u_{it-1})}{var(u_{it-1})[\beta^2 var(u_{it-1}) + \sigma_v^2] - [\beta var(u_{it-1})]^2} \\
&= \alpha
\end{aligned}
\tag{6}
$$

Before turning to the estimates of equation (5) it is instructive to consider under which conditions α cannot be estimated consistently. Immigrant selection has to depend on the lagged unemployment rate as in (3) rather than on the expected rank of the local labor market in the unemployment distribution (u_i^*) which might be a more reasonable reference point. It also cannot depend on current or future unemployment rates. Most models where immigrants based their settlement decision on expected unemployment rates would imply reduced forms that depend either on u_i^* or on current unemployment rates when expectations are formed. Given that we consider two periods which are four years apart some individuals will most likely have gathered more current information when making their decisions.

A second source of bias will be introduced if ε_{it} is serially correlated. From table 5 this obviously seems to be the case. Given that the model is approximately correct, we conjecture that any bias introduced by misspecification is likely to be small. This will be true in particular compared to the IV estimates presented in tables 3 and 4. In fact, the way misspecification affects (6) is such that these biases cannot be signed and may approximately cancel.

While we have motivated this model specifically for the unemployment rate we present estimates of (5) for the other dependent variables as well despite the fact that the model may not be equally appropriate. We also include levels of the 1985 regressors used previously. Tables

3 and 4 display estimates of α from (5) in the last column. We refer to these specifications loosely as levels specification. For the employment rates these estimates do not differ much from the differenced specification (2). For the unemployment rate α is basically zero. Estimating ß in the unemployment specification using equation (3) yields a coefficient of -0.059 with a standard error of 0.015. This indicates that there may be some immigrant selection on the basis of the level of the unemployment rate.

The impact of foreigners in the wage regression is still positive but reduced. However, this model may be rather inadequate for the wage which does not exhibit the same type of mean reversion as the unemployment rate.[8] The results for Turks indicate that an increased inflow may have a slight negative impact on unemployment but the coefficient is not estimated precisely enough to be significant. Otherwise the results are similar to all foreigners.

Increases in the labor force due to native immigration or growth of the native population may have similar effects as immigration. Adding the growth in the share of natives in the labor market region to the regressions had little effect on the estimates for the foreign share.

If foreigners do not strongly affect labor market outcomes for natives then this may be the result of natives themselves adjusting their migration patterns to increased in-migration. Butcher and Card (1991) use a simple check for this phenomenon by regressing population growth on the change in the number of foreigners divided by total population. If native migration is unrelated to foreign immigration then population growth should rise one-for-one with increased immigration. If we delete Husum from our sample (a regions with unusual changes in the population age 15 to 65) we obtain a regression coefficient of 0.92 (0.39) on the

[8]A regression of the change in wages on the 1985 level yields a coefficient of only -0.03 with a standard error of 0.02.

immigration variable. A slope parameter of one is clearly in the confidence interval. But it is also quite possible that higher migration has reduced the attractiveness of areas for natives. The R^2 of the above regression is 0.033, indicating that little of native migration patterns seem to be explained by increased immigration. Thus this is not a very powerful test of a native migration response. We will turn to a more detailed analysis of these issues in the following section using gross flow data for foreigners and natives for 1986 to 1988.

5 Immigrant Flows from 1986 to 1988

We start this section by analyzing gross and net flow data for immigrants and natives between counties and labor market regions. This has two purposes. First, we want to see whether we can detect particular patterns in the inflow and settlement of newly arriving immigrants. For example, we want to establish whether it is appropriate to work with net flows or whether it is important to distinguish inflows and outflows. Secondly, we want to ask how the migration patterns of immigrants affect native migration. We will then investigate whether there are detectable unemployment effects due to immigrant inflows. In the next few tables we only show results for 1987. Results for the adjacent years were qualitatively very similar.

Table 6 displays some simple models for flows of foreigners. Flows with foreign countries as well as internal migration within Germany is distinguished. The top panel of table 6 shows regression results for counties, using gross flows. Including labor market variables like unemployment and wages in these regressions is potentially problematic, since these variables

are endogenous if there are labor market effects of immigration. We use only 1985 variables and also include the 1985 share of foreigners. Obviously, 1987 flows cannot be causal for these earlier variables but might still be correlated if there are persistent displacement effects of immigration and new migrants settle in the same localities as previous immigrants. The 1985 share of foreigners should adequately control for this problem.

The first column in table 6 shows that inflows seem to be independent of local economic conditions but are mostly to counties where a lot of foreigners live already. Most of the variation in gross flows is actually explained by the regional controls and population density which we include but which are not reported in the table. Internal migration of foreigners is also to counties with more foreigners but the relationship is much weaker. On the other hand, internal migration seems to be deterred slightly by a higher unemployment rate, although the effect is only significant at the 10 percent level.

The next two columns show similar regressions for outflows. The positive relationship with the foreign share is mechanical, more foreigners can move away if more of them are present in a locality initially.[9] Apart from these size effects, there is a strong correlation of inflows and outflows: 0.93 between foreign inflows and outflows and 0.72 between inflows and outflows within Germany. This may mean that there are certain counties that are high turnover locations, having a lot of arrivals as well as departures. Given that we have tried to eliminate outliers due to refugee and Aussiedler camps as well as the gateway city Berlin, we doubt that these could be fully explained by initial arrivals from abroad who move on subsequently. This would also

[9]This might suggest to normalize the gross outflows of foreigners by the foreign population rather than the total population. For consistency reasons we do not pursue this. The size of the foreign population should be adequately controlled for since the foreign share is included as a regressor.

not explain the high correlation between domestic inflows and outflows.

The bottom panel in table 6 refers to net flows and repeats the same regressions for counties and labor market regions. Recall that all we can construct for the labor market regions is net foreign inflows (inflows from abroad minus outflows abroad) and net domestic inflows (inflows from Germany minus outflows to Germany). Many flows between counties tend to be moves from the cities to the suburbs or other moves within one metropolitan area. In fact, while no pattern emerges for the net flows at the county level we do find that net foreign inflows at the level of labor market regions are still correlated with the foreign share in the region. For domestic flows on the other hand, this correlation becomes negative, indicating that foreigners may arrive in certain cities that act as gateways and later move on to areas with a lower concentration of foreigners.

The patterns of immigration and settlement of foreigners during 1987 seem to be fairly independent of local labor market conditions. Internal migration of foreigners is more responsive to the local unemployment rate, possibly indicating assimilation effects. Our earlier analysis based on changes in the share of foreigners between 1985 and 1989 combines these effects and also indicated a slight effect of the local unemployment rate.

Table 7 turns to migration patterns of natives repeating the previous exercise. Foreign flows resemble the findings for foreigners a lot indicating that even in 1987 we might be picking up a fair number of entering ethnic Germans or Aussiedler that probably closely resemble other immigrants of foreign nationality.[10] Domestic flows show a quite different pattern from the flows of foreigners. First, Germans tend to avoid localities with a large foreign share, though

[10]In fact, 78,000 Aussiedler entered Germany in 1987. Our data imply an inflow of 150,000 Germans from abroad indicating that Aussiedler make up half of this number.

the size of this effect is ill-determined. Furthermore, inflows are related to unemployment and wage levels in the way expected from standard economic theory. However, gross outflows tend to be positively related to low unemployment as well, albeit less strongly. The correct signs are therefore preserved in the net flow equation. The result for unemployment also carries over to the regression for labor market regions while the wage coefficient becomes negative and insignificant. Net flows continue to show a negative relationship with the share of foreigners in the locality.

Table 8 turns to the question whether foreign arrival rates influence the migration pattern of natives. Such a negative relationship has been found by Filer (1992) for U.S. metropolitan areas in the 1970s. The regressions include the same controls also used in table 7 which are not shown any more. The top panel of the table again analyzes counties. Concentrate for a moment on gross domestic inflows of Germans in the first column, presumably the group that could most easily adapt their location decision to the behavior of immigrants. However, gross inmigration seems to be to the same counties in which foreigners arrive. In particular, it is strongly related to inmigration of foreigners already residing in Germany. This indicates that what we are likely to observe in these regressions is that there are destinations that are attractive for both foreigners and Germans rather than possible displacement effects. The pattern of outflows of Germans seems less consistent with this hypothesis since it is similarly related to domestic inflows of foreigners rather than their outflows. This might be explained by a "recycling" of internal migrants, migrants who move more than once a year so that they appear as inflows and as outflows. Net flows of Germans remain to be positively related to inflows of foreigners and negatively to outflows, providing support for the hypothesis that there are certain attractive cities.

The bottom panel of the table corroborates this finding using net flows of foreigners for counties and labor market regions. Since migration responses by natives might not be immediate we also tried using lagged flows of foreigners in these regressions. The results were generally similar but weaker and mostly insignificant.

If there are strong unobserved location specific amenities attractive to both foreigners and natives this will obscure any displacement effect foreign inmigration has on the arrival of natives. In the regressions in table 8 we have also included the foreign share in 1985 as a regressor. Arguably, natives may not be affected by the stock of foreigners already living in a locality but only by recent arrivals. In this case, the foreign share in 1985 can be used as an instrument for the foreign inflow. Neglecting domestic migration of foreigners for the moment, the coefficient of net native domestic inflows on net foreign inflows from abroad is 0.87 (0.22) using labor market regions. When instrumented with the foreign share in 1985 and the foreign share squared this coefficient becomes 0.83 (0.62). If the instrument is valid there is little evidence that the foreign inflow is endogenous in these regressions.

Finally, we return to the analysis of unemployment. Table 9 reports estimates of equations similar to (5). We provide estimates for the years 1986, 1987, and 1988. 1986 is the first year we can use since county level unemployment rates are available only from 1985 and we include the lagged unemployment rate. We do not use 1989 since large inflows of ethnic Germans and the opening of the Berlin Wall might yield untypical results. The first panel again shows results for counties using gross flows. We also include native flows in these equations (not shown) since any expansion of the labor force might induce additional unemployment. The coefficients switch signs and are almost all small and insignificant. The same pattern holds up

in the bottom panel for net flows into counties and labor market regions. For the labor market regions, we only find a significant detrimental effect of domestic inflows of foreigners on unemployment in 1987. Given the number of coefficients estimated there is a good chance that this finding is due to sampling variation. We note in passing that the coefficients for native migration were equally small and insignificant.

In summary, we found that native migration exhibits some responsiveness to local economic conditions. This is not true for foreigners entering from abroad while internal migration of foreigners falls in between. We find no direct evidence that foreign immigration influences the migration pattern of natives. However, we note that our regressions are likely to be plagued by an endogeneity problem due to unobserved location effects that influence both natives and foreigners alike. Still, our results differ from the findings of Filer (1992) for the U.S. who found a negative correlation between foreign and native migration into metropolitan areas. Finally, there is no evidence that foreign inflows lead to higher unemployment, though again our results have to be interpreted with care since our specifications only yield consistent estimates in the specific circumstances discussed in the last section.

6 Summary and Conclusions

We have analyzed substitution effects between immigrants and natives across local labor markets in Germany. Looking at changes of such variables as the employment to population ratio, the unemployment rate, and wages we find large effects within labor market regions. We doubt

strongly that these can be attributed to substitution of German and foreign workers. Rather, we suspect that the particular concentration of foreigners in the manufacturing sector, and therefore in certain regions of the country, correlates spuriously with changes in the outcome variable, in particular the unemployment rate. When employing a strategy that removes bias due to mean reversion in unemployment rates and accounts for self-selection of foreign migrants we find significant selection effects but no adverse effects on unemployment.

We then pursue the conjecture that this result may be due to the fact that migrant inflows affect native migration patterns. Our results using gross flow data from 1987 are not consistent with such effects. However, the interpretation of these regressions might be problematic. They might not adequately control for the simultaneity in the movements of foreigners and natives and local economic conditions.

Returning to possible displacement effects of foreigners and using the model that accounts for mean reversion in the unemployment rates we find no evidence for higher unemployment due to immigrant arrivals using the flow data. Since any such effects most likely would be a short term disequilibrium phenomenon, immigrant inflows may be the more appropriate variable rather than the change in the foreign share. The latter will also include second generation immigrants (which are still counted as foreigners under German law) who are unlikely to differ much from natives. Either way, our results consistently show that there is little evidence for displacement effects due to immigration.

Our results are in stark contrast to the findings of Winkelmann and Zimmermann (1992) and DeNew and Zimmermann (1993) who find higher unemployment and lower wages in industries with a higher share of foreigners. One difference between these studies and ours is

that we analyze a boom period where unemployment rates were falling. Immigrant absorption might also have been easier then during the late 1970s and mid 1980s which is the period their studies concentrate on. Another advantage of the DeNew and Zimmermann study over ours is that they can separate blue and white collar workers. Negative wage effects only occur for blue collar workers. On the other hand, their analysis is based on the levels of the levels of employment and wages while we have concentrated on changes in these variables as well as immigrant flows. Interpreting the labor market effects of immigration as short term displacements of a particular labor market from steady state, theory suggests that we should observe these effects in the changes of the relevant variables. Once a labor market has reached steady state comparative statics in a supply-demand model does not suggest a particular relationship between wages or employment and the share of foreigners. We also suspect that the results of Winkelmann and Zimmermann (1992) and DeNew and Zimmermann (1993) are likely to reflect the fact that guestworkers entered booming manufacturing sectors in the 1960s which started to decline in the late 1970s and 1980s, the period they study. Instrumenting the foreign share by industry dummies or industry trends, as in DeNew and Zimmermann will not remove this problem.

Of course, our study is unlikely to have overcome the endogeneity problem due to immigrant self-selection. It would be useful to have a "natural experiment," a large exogenous inflow of foreigners to particular areas to be able to address this problem. The opening of Eastern European borders in the late 1980s could potentially be such an event. In a case study for one particular industry, the construction sector, (Pischke and Velling, 1993) we conclude that this unlikely to give clean results since West Germany was experiencing a strong economic

expansion at the same time. Consistent with our findings in this paper, we concluded in our earlier study that the timing of the inflow of Eastern Europeans, employment, revenues and productivity in the construction industry can hardly be reconciled with negative wage or employment effects due to immigration.

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Table 1
Means and Standard Deviations of Key Variables
Labor Market Regions

Variable	1985 (percent)	1989 (percent)	Changes (percentage points)
Population (persons)	356,388 (562,088)	364,750 (472,941)	8,362 (15,10)
Employment/ Population age 15-64	44.4 (6.2)	46.5 (6.4)	2.9 (1.6)
Employment/Population (Germans)	44.3 (6.2)	46.8 (6.5)	2.9 (1.5)
Employment/Population (Foreigners)	47.0 (13.5)	42.8 (11.9)	4.7 (4.7)
Unemployment Rate	9.4 (3.4)	6.5 (2.7)	-2.9 (1.7)
Monthly Manufacturing Wage (Marks)	3,190 (429)	3,845 (540)	656 (196)
Log Manufacturing Wage	8.06 (0.13)	8.25 (0.14)	0.19 (0.05)
Foreign Share (population)	4.8 (2.8)	5.5 (3.0)	0.8 (0.4)
Foreign Share (ages 15-64)	5.2 (2.9)	6.1 (3.2)	1.0 (0.5)
Share of Turks (population)	1.6 (1.1)	1.8 (1.2)	0.3 (0.2)
Number of Observations	166	166	166

Note: Excluding Berlin. See text for variable definitions.

Table 2
Means and Standard Deviations of Migrant Flows

Variable	Counties	Labor Market Regions
Population (persons) 1985	179,019 (156,810)	356,388 (462,088)
Gross Foreign Inflow from Abroad 1987	5.95 (4.43)	---
Gross Foreign Inflow from Germany 1987	2.71 (1.54)	---
Gross Foreign Outflow Abroad 1987	4.32 (3.35)	---
Gross Foreign Outflow to Germany 1987	2.65 (1.76)	---
Net Foreign Inflow from Abroad 1987	1.63 (1.82)	1.47 (1.28)
Net Foreign Inflow from Germany 1987	0.06 (1.25)	-0.06 (0.82)
Gross Native Inflow from Germany 1987	27.74 (8.93)	---
Gross Native Outflow to Germany 1987	28.12 (7.94)	---
Net Native Inflow from Germany 1987	-0.38 (3.77)	-0.75 (3.19)
Unemployment Rate December 1985	10.7 (4.0)	11.0 (4.2)
Unemployment Rate December 1989	7.6 (3.0)	7.6 (2.7)
Number of Observations	319	160

Notes: All flow variables are per 1000 residents. Six counties with unusually large gross flows due to refugee camps are deleted as well as Bonn, its surrounding area, and Berlin, see text for details.

Table 3
The Impact of Foreigners on Local Labor Market Outcomes
All Foreigners
(White standard errors in parentheses)

Dep. Variable	Differences	Differences (IV)	Over-id Test (p-value)	Mean Reversion Model
Employment/ Population Ratio[a)]	-0.41 (0.23)	-0.50 (0.38)	0.380	-0.65* (0.25)
Employment/ Population Ratio[a)] (Germans Only)	-0.50* (0.22)	-0.36 (0.38)	0.307	-0.28 (0.26)
Unemployment Rate	1.08* (0.24)	2.47* (0.48)	0.034	0.17 (0.14)
Log Manufacturing Wage	1.81* (0.75)	3.29* (1.17)	0.405	1.85* (0.93)

[a)] Population age 15 to 64.
* significant at the 5% level.
Notes: Analysis at the level of labor market regions excluding Berlin. Numbers shown are coefficients on the change in the number of foreigners aged 15 to 64 divided by the total population in this age group in 1985. Regressions also include a constant, 12 industry shares, 2 dummies for missing industries, the share of highly qualified workers, the share of unqualified workers, the share of workers over age 55, the share of part-time workers, the share of female workers, 8 dummies for degree of agglomeration, the log of population density, and the ratio of population aged 15-64 to the total population. The difference regressions include regressors in differences, the mean reversion regressions in 1985 levels. The change in the share of foreigners is instrumented in column 2 by the foreign share in 1985 and the same variable squared. First stage R^2 is 0.60. The over-identification test is the Hansen-Sargan test. Number of observations is 166. See text for more details.

Table 4
The Impact of Foreigners on Local Labor Market Outcomes
Turks Only
(White standard errors in parentheses)

Dep. Variable	Differences	Differences (IV)	Over-id Test (p-value)	Mean Reversion Model
Employment/ Population Ratio[a)]	0.04 (0.47)	-1.12 (0.70)	0.739	-0.20 (0.54)
Employment/ Population Ratio[a)] (Germans Only)	-0.12 (0.46)	-1.31 (0.71)	0.602	0.17 (0.54)
Unemployment Rate	1.43* (0.59)	3.12* (1.04)	0.000	-0.41 (0.36)
Log Manufacturing Wage	2.22 (1.37)	1.88 (2.36)	0.163	2.76 (1.89)

[a)] Population age 15 to 64.
* significant at the 5% level.
Notes: Analysis at the level of labor market regions excluding Berlin. Numbers shown are coefficients on the change in the number of Turks divided by the total population in 1985. Regressions also include a constant, 12 industry shares, 2 dummies for missing industries, the share of highly qualified workers, the share of unqualified workers, the share of workers over age 55, the share of part-time workers, the share of female workers, 8 dummies for degree of agglomeration, the log of population density, and the ratio of population aged 15-64 to the total population. The difference regressions include regressors in differences, the mean reversion regressions in 1985 levels. The change in the share of foreigners is instrumented in column 2 by the foreign share in 1985 and the same variable squared. First stage R^2 is 0.71. The over-identification test is the Hansen-Sargan test. Number of observations is 166. See text for more details.

Table 5
Summary Statistics on Local Unemployment Rates 1985-1989

Correlations	1985	1986	1987	1988	1989
1985	1.00				
1986	0.98	1.00			
1987	0.97	0.99	1.00		
1988	0.95	0.96	0.99	1.00	
1989	0.83	0.86	0.90	0.94	1.00
Mean	11.0	10.1	10.3	9.6	7.6
Standard Deviation	4.1	4.0	3.9	3.6	2.7

Note: Analysis at the level of 166 Labor Market Regions, excluding Berlin. Unemployment rates are for December and are expressed in percent. (Notice that the unemployment rates used in tables 1-4 refer to June, this accounts for deviations between this table and table 1.)

Table 6
Immigrant Migration Patterns 1987
(White standard errors in parentheses)

Independent Variable	Gross Foreign Inflow	Gross Domestic Inflow	Gross Foreign Outflow	Gross Domestic Outflow
Unemployment Rate 1985	1.4 (8.4)	-4.4 (2.4)	-1.5 (5.8)	-2.0 (5.7)
Log Manufacturing Wage 1985	2.2 (1.7)	0.5 (0.5)	1.1 (1.5)	1.1 (0.6)
Foreign Share 1985	96.3* (23.6)	22.2* (6.2)	80.8* (19.8)	26.7* (7.2)
Foreign Share 1985 Squared	-135.3 (77.6)	11.0 (35.7)	-133.1 (79.2)	-40.2 (26.6)
R^2	0.608	0.708	0.564	0.411

Independent Variable	Net Foreign Inflow Counties	Net Domestic Inflow Counties	Net Foreign Inflow LMR	Net Domestic Inflow LMR
Unemployment Rate 1985	2.9 (6.0)	-2.3 (5.2)	0.5 (3.5)	-5.8 (3.5)
Log Manufacturing Wage 1985	1.1 (0.7)	-0.5 (0.4)	-0.3 (1.3)	-0.2 (0.8)
Foreign Share 1985	15.6 (11.2)	-4.6 (6.5)	33.9* (15.4)	-26.4* (8.7)
Foreign Share 1985 Squared	-2.2 (46.0)	51.2* (24.3)	-69.9 (89.5)	175.3* (52.7)
R^2	0.334	0.072	0.419	0.107

* significant at the 5% level.
Note: All models estimated by OLS. Dependent variable is flows per 1000 residents. Regressions also include a constant, a dummy for "Kreisstadt" (not included for LMRs), the log of population density, and six regional dummies. Top panel reports regressions for 319 counties, bottom panel for counties/160 Labor Market Regions. Six counties/regions with unusually large gross flows due to refugee camps are deleted as well as Bonn, its surrounding area, and Berlin.

Table 7
Native Migration Patterns 1987
(White standard errors in parentheses)

Independent Variable	Gross Foreign Inflow	Gross Domestic Inflow	Gross Foreign Outflow	Gross Domestic Outflow
Unemployment Rate 1985	-1.6 (3.6)	-99.0* (20.6)	-3.7* (1.2)	-51.2* (17.1)
Log Manufacturing Wage 1985	-0.1 (0.6)	8.5 (4.4)	0.4 (0.3)	3.8 (3.8)
Foreign Share 1985	37.8* (9.0)	-54.0 (47.0)	7.1* (3.1)	-49.8 (37.7)
Foreign Share 1985 Squared	-148.3* (35.4)	-41.4 (161.7)	-27.7* (13.5)	-30.1 (143.8)
R^2	0.379	0.435	0.337	0.504

Independent Variable	Net Foreign Inflow Counties	Net Domestic Inflow Counties	Net Foreign Inflow LMR	Net Domestic Inflow LMR
Unemployment Rate 1985	2.1 (3.4)	-47.8* (9.2)	-1.0 (4.6)	-32.7* (12.2)
Log Manufacturing Wage 1985	-0.4 (0.6)	4.7* (1.7)	0.2 (0.9)	-3.9 (2.2)
Foreign Share 1985	30.7* (8.8)	-4.2 (22.4)	24.6 (10.3)	-53.0 (36.6)
Foreign Share 1985 Squared	-120.6* (31.9)	-11.4 (94.5)	-189.0 (64.1)	-265.6 (199.7)
R^2	0.247	0.296	0.247	0.357

* significant at the 5% level.
Note: All models estimated by OLS. Dependent variable is flows per 1000 residents. Regressions also include a constant, a dummy for "Kreisstadt" (not included for LMRs), the log of population density, and six regional dummies. Top panel reports regressions for 319 counties, bottom panel for counties/160 Labor Market Regions. Six counties/regions with unusually large gross flows due to refugee camps are deleted as well as Bonn, its surrounding area, and Berlin.

Table 8
Native Migration and Immigrant Inflows 1987
(White standard errors in parentheses)

Independent Variable	Gross Native Domestic Inflow	Gross Native Domestic Outflow	Net Native Domestic Inflow
Gross Foreign Inflow from Abroad	0.640 (0.414)	-0.010 (0.352)	0.650* (0.146)
Gross Foreign Inflow from Germany	4.367* (0.579)	3.480* (0.443)	0.886* (0.290)
Gross Foreign Outflow Abroad	-0.353 (0.451)	0.282 (0.377)	-0.636* (0.186)
Gross Foreign Outflow to Germany	-0.399 (0.643)	0.146 (0.590)	-0.545* (0.161)
R^2	0.602	0.659	0.344

Independent Variable	Net Native Domestic Inflow Counties	Net Native Domestic Inflow LMR
Net Foreign Inflow from Abroad	0.717* (0.148)	1.154* (0.216)
Net Foreign Inflow from Germany	0.637* (0.171)	0.675* (0.286)
R^2	0.338	0.450

* significant at the 5% level.
Note: All models estimated by OLS. Regressions also include a constant, the unemployment rate, the log of the manufacturing wage, the foreign share and the foreign share squared, the log of population density (all these variables are for 1985), a dummy for "Kreisstadt" (not included for LMRs), and six regional dummies. Top panel reports regressions for 319 counties, bottom panel for counties and 160 Labor Market Regions. Six counties/regions with unusually large gross flows due to refugee camps are deleted as well as Bonn, its surrounding area, and Berlin.

Table 9
Unemployment and Immigrant Inflows 1986-1988
(White standard errors in parentheses)

Independent Variable	1986	1987	1988
Gross Foreign Inflow from Abroad	-0.006 (0.033)	0.045 (0.028)	0.036 (0.026)
Gross Foreign Inflow from Germany	-0.113* (0.042)	0.015 (0.050)	0.010 (0.043)
Gross Foreign Outflow Abroad	0.002 (0.036)	-0.073* (0.034)	-0.055 (0.031)
Gross Foreign Outflow to Germany	-0.002 (0.033)	-0.036 (0.028)	-0.033 (0.030)
R^2	0.975	0.977	0.977

Independent Variable	1986 Counties	1987 Counties	1988 Counties	1986 LMR	1987 LMR	1988 LMR
Net Foreign Inflow from Abroad	-0.031 (0.031)	0.034 (0.028)	0.025 (0.025)	-0.037 (0.060)	0.027 (0.047)	0.056 (0.029)
Net Foreign Inflow from Germany	-0.028 (0.031)	0.028 (0.030)	0.021 (0.030)	0.017 (0.057)	0.103* (0.047)	0.078 (0.040)
R^2	0.974	0.977	0.977	0.980	0.982	0.987

* significant at the 5% level.
Note: All models estimated by OLS. Dependent variable is the unemployment rate. Flows are measured per 100,000 residents. Regressions also include a constant, the lagged unemployment rate, 4/2 variables for gross/net native flows of the respective year (top/bottom panel), 12 industry shares, 2 dummies for missing industries, the share of highly qualified workers, the share of unqualified workers, the share of workers over age 55, the share of part-time workers, the share of female workers, 6 regional dummies, and the log of population density; all regressors except lagged unemployment and native flows refer to 1985. Top panel reports regressions for 319 counties, bottom panel for counties and 160 Labor Market Regions. Six counties/regions with unusually large gross flows due to refugee camps are deleted as well as Bonn, its surrounding area, and Berlin.

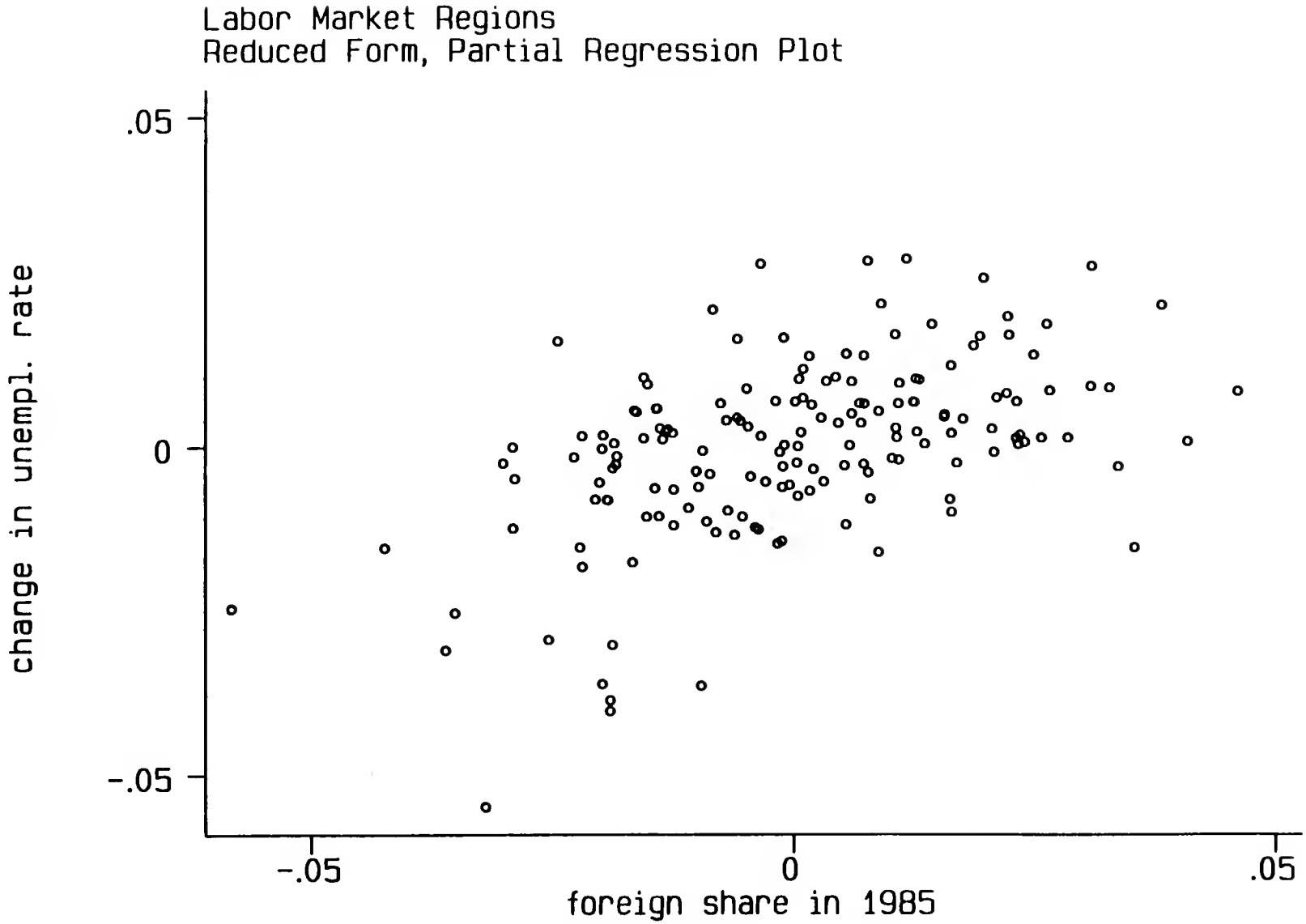
Labor Market Regions
Reduced Form, Partial Regression Plot
.05
0
-.05
change in unempl. rate
-.05
0
.05
foreign share in 1985

Figure 1

Labor Market Regions
Mean Unemployment Rate by 1985 Rank
unemployment rate in percent
20
15
10
5
85
86
87
88
89
year

Figure 2

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